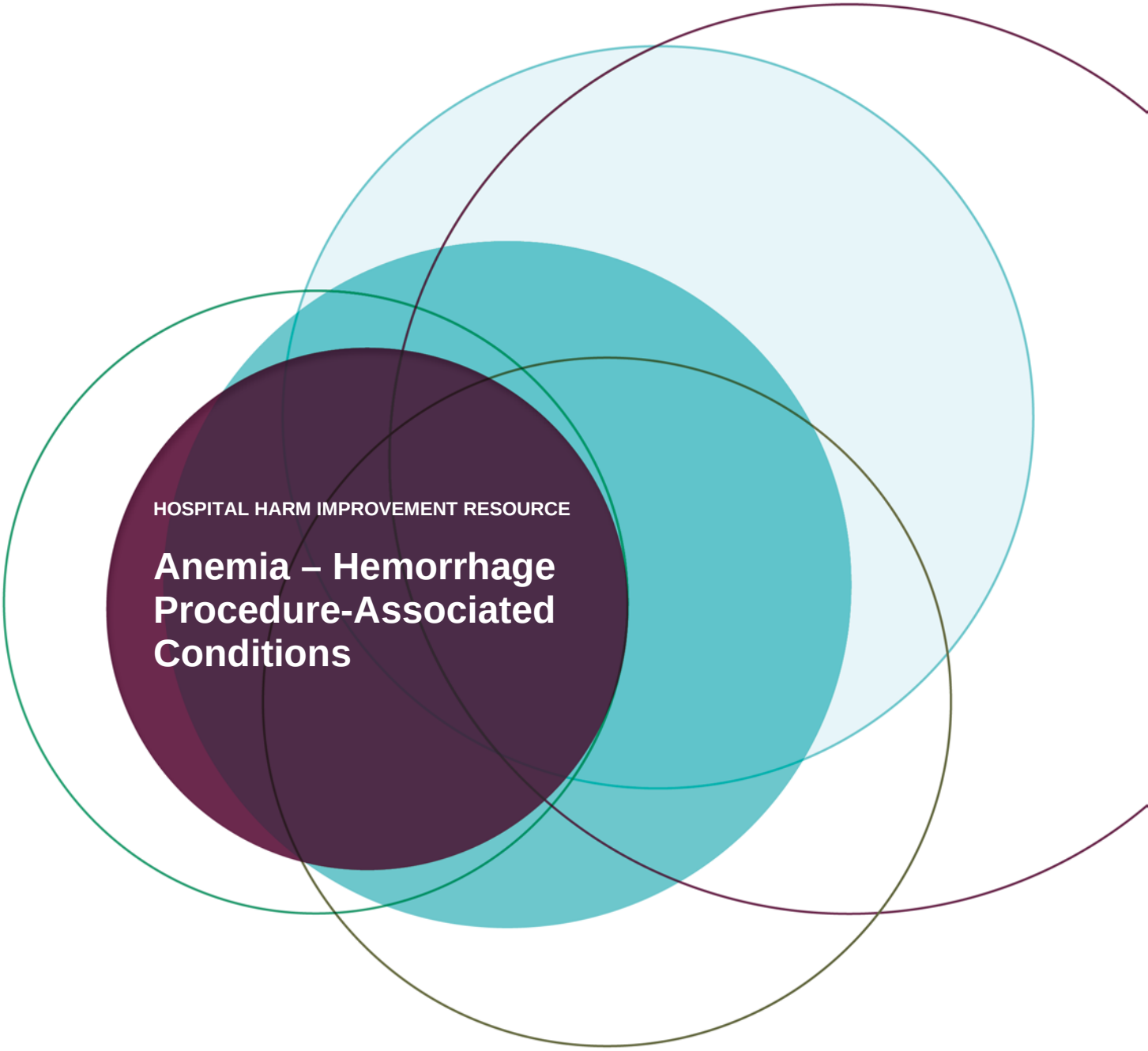

HOSPITAL HARM IMPROVEMENT RESOURCE

Anemia – Hemorrhage Procedure-Associated Conditions

cpsi icsp
Canadian Patient Safety Institute
Institut canadien pour la sécurité des patients

ACKNOWLEDGEMENTS

The Canadian Institute for Health Information and the Canadian Patient Safety Institute have collaborated on a body of work to address gaps in measuring harm and to support patient safety improvement efforts in Canadian hospitals.

The Hospital Harm Improvement Resource was developed by the Canadian Patient Safety Institute to complement the Hospital Harm measure prepared by the Canadian Institute for Health Information. It links measurement and improvement by providing resources that will support patient safety improvement efforts.

DISCHARGE ABSTRACT DATABASE (DAD) CODES INCLUDED IN THIS CLINICAL CATEGORY:

D01: Anemia – Hemorrhage (Procedure-Associated Conditions)

Concept	Hemorrhage or hemorrhagic anemia associated with a medical or surgical procedure.
Notes	1. This clinical group excludes obstetric hemorrhage (refer to A02: Obstetric Hemorrhage and D02: Obstetric Hemorrhage) and hemorrhage or hemorrhagic anemia associated with the delivery of health care or related to the administration of anticoagulants (refer to D01: Anemia — Hemorrhage). 2. The blood transfusion indicator is optional to code in British Columbia.
Selection criteria	
D62 T81.0	Identified as diagnosis type (2) AND Y60-84 in the same diagnosis cluster AND documentation of blood transfusion (blood received indicator = 1)
Codes	**Code descriptions**
D62	Acute posthemorrhagic anemia
D81.0	Hemorrhagic and haematoma complicating a procedure, not elsewhere classified
Additional Codes	**Inclusions**
Y60-Y84	Complications of medical surgical care (refer to Appendix A of the Hospital Harm Indicator General Methodology Notes)

Overview and Implications

Hemorrhage or hemorrhagic anemia refers to anemia secondary to acute blood loss associated with a medical or surgical procedure. Bleeding is a potential complication of any surgical procedure, and the risk is proportional to the size and complexity of the surgery. High blood loss is associated with certain types of surgery such as cardiac and liver surgeries, certain orthopaedic procedures (such as hip replacement) and obstetric surgery. Mortality may be greatly increased when severe bleeding occurs during the operative procedure (National Institute for Health and Care Excellence (NICE), 2014).

A search of patient safety reporting/alert systems uncovered the following incidents of hemorrhage for patients undergoing medical or surgical procedures:

- Hemorrhage after liver biopsy (National Patient Safety Agency (NPSA) & National Reporting and Learning Service (NRLS), 2009)
- Hemorrhage following removal of femoral catheter (NPSA & NRLS, 2010b)
- Hemorrhage from arteriovenous fistula (NPSA & NRLS, 2011)
- Hemorrhage following placement of gastrostomy (NPSA & NRLS, 2010a)
- Hemorrhage during dialysis (Veterans Affairs Central Office, National Center for Patient Safety, 2008)
- Hemorrhage during/following colonoscopy (Oregon Patient Safety Commission, 2015)

There is a relationship between pre-operative anemia and hemorrhage during surgical procedures. Iron deficiency is a common cause of pre-operative anemia and it should be corrected at prior to surgery to achieve optimal results (Gombotz, 2012; Theusinger et al., 2014; Theusinger et al., 2007). Bleeding that occurs in hospital as a result of a medical or surgical procedure is associated with increased morbidity, mortality and increased length of stay (Clevenger et al., 2015; Ferraris et al., 2012; Gombotz, 2012; Muñoz et al., 2016; Musallam et al., 2011; Spahn, 2010).

For additional information regarding Hospital Harm anemia – hemorrhage, please refer to the Hospital Harm Improvement Resource Anemia – Hemorrhage: Health Care / Medication Associated Condition.

Goal

Reduce the incidence of hemorrhage or hemorrhagic anemia secondary to medical or surgical procedures.

Importance for Patients and Families

Even mild anemia leads to impaired functional capacity, physical performance and a reduced quality of life. As anemia worsens, tissue hypoxia and organ dysfunction become apparent

(Clevenger et al., 2015). Hemorrhage is understandably alarming to patients and families. Not only may it be life-threatening, it complicates care and prolongs hospitalization.

Patients who experience hemorrhage may require blood transfusions (Spahn, 2010). Risks of blood transfusions include transmission of bacterial or viral infections, febrile transfusion reactions and transfusion-related acute lung injury (Mazer, 2014; Spahn, 2010; Theusinger et al., 2014).

Patient Stories

We are looking for a patient story related to hemorrhage or hemorrhagic anemia associated with a medical or surgical care. If you have one, please share it with the Canadian Patient Safety Institute at info@cpsi-icsp.ca.

Clinical and System Reviews, Incident Analyses

Given the broad range of potential causes of anemia - hemorrhage, clinical and system reviews should be conducted to identify potential causes and determine appropriate recommendations.

Occurrences of harm are often complex with many contributing factors. Organizations need to:

1. Measure and monitor the types and frequency of these occurrences.
2. Use appropriate analytical methods to understand the contributing factors.
3. Identify and implement solutions or interventions that are designed to prevent recurrence and reduce risk of harm.
4. Have mechanisms in place to mitigate consequences of harm when it occurs.

To develop a more in-depth understanding of the care delivered to patients, chart audits, incident analyses and prospective analyses can be helpful in identifying quality improvement opportunities. Links to key resources for conducting chart audits and analysis methods are included in the Hospital Harm Improvement Resources Introduction.

If your review reveals that your cases of anemia - hemorrhage are linked to specific processes or procedures, you may find these resources helpful:

- American Society of Anesthesiologist. www.asahq.org
  - American Society of Anesthesiologists: Practice Guidelines for Perioperative Blood Management (2015). https://anesthesiology.pubs.asahq.org/article.aspx?articleid=2088825
- British Committee for Standards in Haematology. https://www.guidelinecentral.com/summaries/organizations/british-committee-for-standards-in-haematology/
- Canadian Medical Association - CPG Infobase: Clinical Practice Guidelines. https://joulecma.ca/cpg/homepage

- Canadian Patient Safety Institute - Canadian Surgical Safety Checklist. https://www.patientsafetyinstitute.ca/en/toolsResources/Pages/SurgicalSafety-Checklist-Resources.aspx
- European Society of Anesthesiology. www.esahq.org
  - European Society of Anaesthesiology: Management of severe perioperative bleeding (2017). https://journals.lww.com/ejanaesthesiology/fulltext/2017/06000/Management_of_severe_perioperative_bleeding__.3.aspx
- National Blood Authority- Australia. https://www.blood.gov.au/patient-blood-management-pbm#guidelines
- National Institute for Health and Care Excellence (NICE). www.nice.org.uk
- Network for the Advancement of Patient Blood Management - Haemostasis and Thrombosis. nataonline.com
- Ontario Regional Blood Coordinating Network- Bloody Easy for Healthcare Professionals. https://transfusionontario.org/en/documents/?cat=bloody_easy
- Thrombosis Canada. https://thrombosiscanada.ca/
- The British Society for Haematology. https://b-s-h.org.uk/guidelines/
- World Health Organization - Safe Surgery. https://www.who.int/patientsafety/safesurgery/en/

MEASURES

Vital to quality improvement is measurement, and this applies specifically to implementation of interventions. The chosen measures will help to determine whether an impact is being made (primary outcome), whether the intervention is actually being carried out (process measures), and whether any unintended consequences ensue (balancing measures).

In selecting your measures, consider the following:

- Whenever possible, use measures you are already collecting for other programs.
- Evaluate your choice of measures in terms of the usefulness of the final results and the resources required to obtain them; try to maximize the former while minimizing the latter.
- Try to include both process and outcome measures in your measurement scheme.
- You may use different measures or modify the measures described below to make them more appropriate and/or useful to your particular setting. However, be aware that modifying measures may limit the comparability of your results to others.

- Posting your measure results within your hospital is a great way to keep your teams motivated and aware of progress. Try to include measures that your team will find meaningful and exciting (IHI, 2012).

GLOBAL PATIENT SAFETY ALERTS

Global Patient Safety Alerts (GPSA) provides access and the opportunity to learn from other organizations about specific patient safety incidents including alerts, advisories, recommendations and solutions for improving care and preventing incidents. Learning from the experience of other organizations can accelerate improvement.

Recommended search terms:

- Anemia
- Hemorrhage
- Bleeding
- Blood transfusion
- Blood conservation
- Post-op bleed

ANEMIA - HEMORRHAGE SUCCESS STORIES

Best Practice in Patient Blood Management in a Surgical Patient Population

Sunnybrook Health Sciences Centre, Toronto, Ontario (Sunnybrook Health Sciences Centre, 2013)

The greatest predictor of whether a patient will need a transfusion is their preoperative hemoglobin level. The Holland Centre at Sunnybrook performs over 3,000 orthopaedic surgical procedures annually. In 2011, it introduced routine CBC (complete blood count) preoperative screening of all surgical candidates to identify anemic patients, manage potential anemia and refer high risk patients to the Blood Conservation Clinic for anemia optimization before surgery. All preoperative patients are given oral iron for one month. If patients are anemic, they are referred to the Blood Conservation Clinic (BCC) four to six weeks preoperatively for consideration of IV iron or Eprex. The project involved an interprofessional team that included Anesthesia, Hematology, Nursing, and Orthopaedic Surgeons. A preoperative blood conservation algorithm was designed and broad staff education was conducted. Patient education materials were also developed. Transfusion rates during the study period were 3.6% compared to 5.1% previously. The estimated cost-savings associated with fewer transfusions in this patient population was $75,000.

From blood transfusions, to heart surgery, to lung infections, Dr. Paul Hébert is doing research to improve the way we care for the sickest patients in the hospital
(Ottawa Hospital Research Institute, 2006)

Dr. Paul Hébert treats the sickest patients in The Ottawa Hospital – three of every 10 patients who arrive in the intensive care unit will never recover….While Dr. Hébert spends about half of his time trying to heal these patients one-by-one, the other half is spent on critical care research that is helping hundreds of thousands of patients in Ottawa and around the world….he found that patients treated aggressively with transfused blood had a higher death rate than patients whose doctors waited to order a transfusion. Read the full news article here.

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